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e-brief

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Heads of the Class: A Comparison of Ontario School Boards by Student Achievement

By David Johnson

- This *e-brief* analyzes the performance of Ontario school boards in terms of student achievement.
- It identifies 13 school boards with above-average student achievement in their schools and 10 with below-average achievement.
- These boards should be examined further to identify what they are doing right or wrong since their performance affects a large number of students.

INDEPENDENT • REASONED • RELEVANT

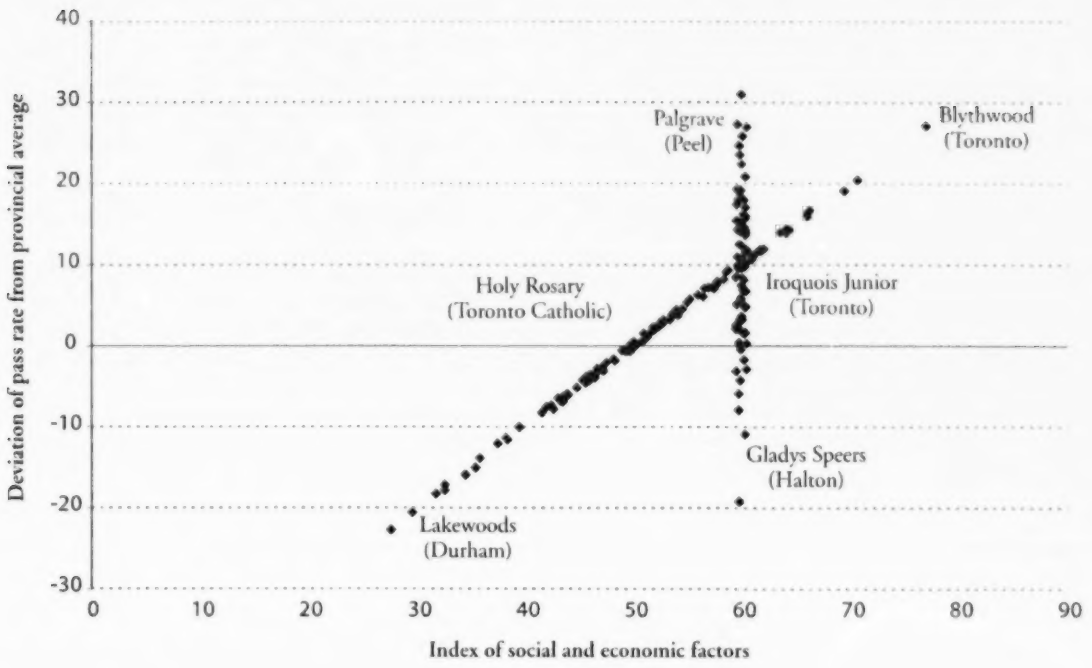
Does differing management of schools by Ontario school boards affect student outcomes? This *e-brief* uses the approach and data I developed in Johnson (2005, 2007) to answer that question. While my previous work provided a method for evaluating and comparing individual school performance based on student achievement, this study focuses on evaluating the performance of entire school boards. I conclude that there are significant differences among school boards in terms of student achievement.

As a starting point, I employ data provided by Ontario's standardized test results in reading, writing and mathematics in grades 3 and 6. These results, however, reflect both the quality of teaching at the school and the socio-economic characteristics of the school's community. Schools where parents have lower socio-economic profiles will have fewer students meet or exceed expectations (herein referred to as a pass) regardless of teacher or administrator effort and ability. Adjusting test scores to remove the influence of these socio-economic factors (which explain about 40 percent of the variation among schools) yields measures of relative school performance that represent a school's effectiveness.

The relationship between a socio-economic index and a school's adjusted pass rate is shown in Figure 1 for an illustrative group of Grade 3 schools.[1] The statistical relationship between socio-economic factors and test scores creates a predicted adjusted pass rate – represented by the upward-sloping line of dots in Figure 1. In our model, an adjusted pass rate of zero represents the average academic performance of schools and a socio-

1 Johnson (2005) developed a method to separate the influence of socio-economic factors from the influence of the school and teachers to identify schools that outperformed other schools with students from similar backgrounds. The socio-economic index is based on factors such as education level or income of adults in the area surrounding a school. Details of the estimation methodology and the creation of the socio-economic index are available in Chapters 4 and 6 of Johnson (2005). The methodology is applied to more recent Ontario data in Johnson (2007) combining data from 2003-04, 2004-05 and 2005-06. A school assessment result is defined using a Grade 3 or Grade 6 standardized test where at least 45 students took the test at that school over the three-year period. Thus the measures accurately capture variation systematic to the school over several years of results and over a large number of students.

Figure 1: Comparing Grade 3 Schools in Ontario: An Example



Sources: Author's calculations, (Johnson 2007).

economic index at 50 represents the average socio-economic composition of schools in Ontario over that period. A school on the upward-sloping line has the same pass rate as schools with similar student backgrounds. The vertical line of dots in Figure 1 shows variation in pass rates amongst schools that share the same social and economic characteristics; that is, share a predicted pass rate. A school above the upward-sloping line of dots is a school above average and a school below the line is below average.

Using the Signposts for Success Data to Compare Boards

How can we use this approach to compare boards? Table 1 provides the data required for comparison. The first column is the average pass rate of students in the school board. The second column provides the total number of observations of Grade 3 and Grade 6 school-level assessments available in each board. The third column reports the number of these assessments at that board that are above average (above the upward-sloping line in Figure 1). The percentage of assessments above the line is found in the fourth column. One board, Superior North Catholic has 100 percent of its assessments above the line, but the board has only one school with results for sufficient number of students to be included in the study. This is hardly a fair basis for comparison with boards with many more schools. Clearly a better methodology is needed.

To understand the methodology I use here, consider a coin flip. If you suspect that the coin is coming up heads more often than tails you can conduct a series of coin flips to ascertain if the coin is actually unfair. However, you must take into account the number of times you flip the coin. If you flip the coin three times and get two heads, it could be just a

Table 1: Ontario School Board Performance Measure

School Board	Average Pass Rate	No. of School Assessment Results in Board	No. of School Assessment Results Above Predicted Pass Rate	Percent of Schools Above Predicted Pass Rate	Probability that Board is Above Average	Probability that Board is Below Average	Average Performance Gap at Board
				(%)	(%)	(%)	(Percentage Points)
Algoma	57.6	38	22	57.9	80	13	3.0
Algonquin and Lakeshore Catholic	57.8	44	25	56.8	78	15	0.1
Autores boréales (French Catholic)	63.1	2	1	50.0	25	25	0.5
Avon Maitland	60.8	71	38	53.5	69	24	2.1
Bluewater	59.8	71	38	53.5	69	24	0.8
Brant Haldimand Norfolk Catholic	60.6	44	23	52.3	56	33	2.6
Bruce-Grey Catholic	61.1	12	7	58.3	62	20	2.8
Centre Sud-Ouest (French)	64.2	24	11	45.8	28	59	-0.6
Centre-Est de l'Ontario (French Catholic)*	71.9	51	33	64.7	98	1	1.6
Centre-Sud (French Catholic)	67.5	47	22	46.8	29	62	-0.4
Dufferin-Peel Catholic**	61.6	218	73	33.5	0	100	-3.1
Durham Catholic	61.1	73	32	43.8	13	83	-1.1
Durham**	58.4	185	76	41.1	1	100	-1.8
Eastern Ontario Catholic*	59.3	53	37	69.8	100	1	2.7
Franco-Nord (French Catholic)	61.5	12	6	50.0	39	39	3.7
Grand Erie**	53.5	106	36	34.0	1	100	-3.2
Grand Nord de l'Ontario (French)	59.9	8	5	62.5	64	15	-0.4
Grandes Rivières (French Catholic)	60.1	22	15	68.2	94	3	3.1
Greater Essex County	58.6	111	54	48.6	36	58	-0.2
Halton Catholic	70.1	70	38	54.3	73	21	0.7
Halton**	62.9	110	30	27.3	0	100	-5.1
Hamilton-Wentworth	55.8	143	63	44.1	7	91	-1.4
Hamilton-Wentworth Catholic*	63.5	98	67	68.4	100	1	4.2
Hastings & Prince Edward	52.1	63	28	44.4	16	78	-2.1
Huron Perth Catholic*	73.3	16	14	87.5	100	1	14.2
Huron-Superior Catholic	55.4	28	15	53.6	58	29	1.9
Kawartha Pine Ridge	58.8	119	60	50.4	50	43	0.2
Keewatin-Patricia	51.9	18	7	38.9	12	76	-2.6
Kenora Catholic	63.0	5	3	60.0	50	19	9.8
Lakehead	56.4	43	23	53.5	62	28	0.8
Lambton Kent*	59.0	95	60	63.2	99	1	2.6
l'Est de l'Ontario (French)**	61.7	35	11	31.4	1	98	-3.9
l'Est ontarien (French Catholic)	64.2	45	24	53.3	62	28	2.4
Limestone	57.4	74	33	44.6	15	80	-0.6
London District Catholic*	64.9	73	47	64.4	99	1	4.8
Near North**	49.8	46	13	28.3	1	100	-5.9
Niagara	59.7	160	89	55.6	92	7	2.0

* Indicates a board where, if you concluded that a school from that board is more likely to outperform a school with similar social and economic characteristics from another board, you would be correct 19 times out of 20.

** Indicates that a school from a board is more likely to produce a weak result.

Sources: Author's calculations, Johnson (2007).

Table 1: Ontario School Board Performance Measure *(continued from previous page)*

School Board	Average Pass Rate	No. of School Assessment Results in Board	No. of School Assessment Results Above Predicted Pass Rate	Percent of Schools Above Predicted Pass Rate	Probability that Board is Above Average	Probability that Board is Below Average	Average Performance Gap at Board
				(%)	(%)	(%)	(Percentage Points)
Niagara Catholic*	65.3	86	66	76.7	100	0	7.7
Nipissing-Parry Sound Catholic	51.3	11	6	54.5	50	28	-1.6
Nord-Est de l'Ontario (French)	54.6	3	2	66.7	50	13	-1.2
Northeastern Catholic	52.5	12	7	58.3	62	20	1.1
Northwest Catholic	61.6	6	5	83.3	90	2	6.5
Nouvel-Ontario (French Catholic)	64.7	22	14	63.6	86	7	6.3
Ontario North East*	54.9	22	16	72.7	98	1	2.6
Ottawa-Carleton Catholic**	61.8	112	29	25.9	0	100	-5.1
Ottawa-Carleton**	56.6	182	31	17.0	0	100	-8.2
Peel	64.6	212	105	49.5	42	53	0.9
Peterborough, Victoria, Northumberland and Clarington Catholic	61.6	55	33	60.0	92	6	3.0
Rainbow	54.5	47	24	51.1	50	39	1.1
Rainy River	56.4	7	4	57.1	50	23	-0.6
Renfrew County	58.2	30	18	60.0	82	11	0.9
Renfrew County Catholic	61.3	21	16	76.2	99*	1	5.7
Simcoe County**	53.3	167	55	32.9	1	100	-4.2
Simcoe Muskoka Catholic	58.2	74	35	47.3	29	64	0.3
St Clair Catholic*	64.4	45	38	84.4	100	0	6.5
Sudbury Catholic	56.3	24	14	58.3	73	16	2.2
Sud-Ouest (French Catholic)	68.0	26	13	50.0	43	43	3.2
Superior North Catholic	75.0	1	1	100.0	50	0	17.1
Superior-Greenstone	56.0	3	1	33.3	13	50	0.9
Thames Valley	58.3	254	122	48.0	25	72	-0.1
Thunder Bay Catholic*	64.4	32	28	87.5	100	0	9.2
Toronto	61.8	657	331	50.4	57	41	0.4
Toronto Catholic	60.9	312	168	53.8	91	8	1.2
Trillium Lakelands	56.2	60	30	50.0	45	45	-1.4
Upper Canada	58.9	109	62	56.9	92	7	1.1
Upper Grand	62.2	104	53	51.0	54	39	-1.1
Waterloo Catholic	63.3	85	49	57.6	91	7	2.2
Waterloo Region	57.9	152	67	44.1	7	92	-2.2
Wellington Catholic	64.7	31	16	51.6	50	37	0.9
Windsor-Essex Catholic*	63.7	79	50	63.3	99	1	3.2
York Catholic*	71.9	149	92	61.7	100	1	2.1
York Region**	68.8	242	104	43.0	2	99	-0.9

* Indicates a board where, if you concluded that a school from that board is more likely to outperform a school with similar social and economic characteristics from another board, you would be correct 19 times out of 20.

** Indicates that a school from a board is more likely to produce a weak result.

Source: Author's calculations, Johnson (2007).

Table 2a: 13 Above-average School Boards in Ontario *(in Alphabetical Order)*

Centre-Est de l'Ontario (French Catholic)
Eastern Ontario Catholic
Hamilton-Wentworth Catholic
Huron Perth Catholic
Lambton Kent
London District Catholic
Niagara Catholic
Ontario North East
Renfrew County Catholic
St Clair Catholic
Thunder Bay Catholic
Windsor-Essex Catholic
York Catholic

Sources: Author's calculations, Johnson (2007).

Table 2b: 10 Below-average School Boards in Ontario *(in Alphabetical Order)*

Dufferin-Peel Catholic
Durham
Grand Erie
Halton
l'Est de l'Ontario (French)
Near North
Ottawa-Carleton
Ottawa-Carleton Catholic
Simcoe County
York Region

Sources: Author's calculations, Johnson (2007).

coincidence. If you flip the coin 100 times and you get 100 heads, you are virtually certain that the coin is heavily weighted in favour of heads.

The same logic is used to evaluate school boards. If a board is average then an assessment from a school in the board has an equal chance (a 50 percent chance) of being above or below the upward-sloping line in Figure 1. This measure of board quality tests whether a school from a particular board is more likely to be above or below the line. Return to the fourth column in Table 1 that shows the percentage of assessments in a board that are above the diagonal line in Figure 1. In Algoma 57.9 percent or 22 of 38 assessment results were above the line making it seem to be an above-average board.

Remember, however, that to be certain that a coin is biased to heads, many coin flips are needed. How many? The fifth column "Probability that Board is Above Average" is interpreted as a measure of certainty as to whether a school in that board is more likely to be above the line. How certain are we that Algoma is an above-average board? The answer is "not very certain." If we labelled Algoma an above-average board when 22 of 38 results are above the line, we would be wrong 20 percent of the time. A common statistical criterion of reliability is to be right at least 95 percent of the time. Using this measure, there are 13 such school boards where we are quite certain that the board is above average. These boards are identified in Table 2a in alphabetical order as it is impossible to determine the 'best' school board among this group of clearly leading boards in Ontario.

Below-average boards (where it is virtually certain these boards produce a larger proportion of below-average schools) can also be identified if a large enough proportion of assessments are below the line.[2] There are 10 boards where we are at least 95 percent certain a board is below average, listed alphabetically in Table 2b.[3] One such board is the

2 The probability that a board is below average has the same interpretation as the probability that a board is above average.

3 It is a complication that you must use two different columns of probability values to conclude that a board is above or below average. This occurs with ties. Consider the example of Trillium Lakelands with 60 assessments, 30 are above the line and 30 below. There is exactly the same amount of evidence that Trillium Lakelands is above average or below average. This only works with an even number of assessments. In Rainy River there are seven observations, four above and three below. This makes it much more unlikely this board is below average and the probability reflects this fact. In the small sample of only seven assessments, the odd number matters more.

French-language public school board l'Est de l'Ontario. With 24 out of 35 schools below the line (68.6 percent) we are virtually certain (98 times out of 100) that this board is worse than average.

Eleven out of the 13 top performing school boards are Catholic. Further, Catholic school boards frequently outperform the public board in the same geographical areas.[4] In those regions, Catholic schools are producing better student results than public schools with similar socio-economic conditions. Stronger results at Catholic boards suggest that competition improves school results since Catholic parents can choose to send their children to either Catholic or public schools. Catholic board managers may be responding by improving the quality of education to attract students and funding, as suggested by Card, Dooley and Payne (2008).

The last column in Table 1 shows the variation at the board level in the average percentage of students that meet or exceed expectations relative to the rest of the province when we compare schools with the same mix of students.[5] For example, in York Catholic District School Board the student pass rate is 2 percentage points higher using this comparison, while in York Region District School Board, the student pass rate is 0.9 percentage points lower. York Catholic is an above-average board. York Region is a below-average board. Both boards are large and the gap affects a large number of students.

Conclusion

Why does it matter to identify which boards do a better job? With many large boards even small differences at a board level can have large overall impacts. This *e-brief* assesses school boards on their record of school management as it affects student achievement. The performance gap among their performances should be a matter for concern and investigation.

4 Public school boards that are outperformed by geographically overlapping Catholic boards (in brackets) are Avon Maitland (Huron Perth Catholic), Grand Erie (Brant-Haldimand-Norfolk Catholic), Greater Essex County (Windsor-Essex Catholic), Halton (Halton Catholic), Hamilton-Wentworth (Hamilton-Wentworth Catholic), Lakehead (Thunder Bay Catholic), Renfrew (Renfrew County Catholic), Thames Valley (London District Catholic), Toronto (Toronto Catholic) and Waterloo (Waterloo Catholic).

5 These are the average test score differences, over schools at these boards, from the upward-sloping line in Figure 1.

References:

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